any of the air gap between the magnetic plates **13**, **14** and the rotating shaft **203** and the air gap between the magnetic plates and the magnetic material member on the side of the final stage gear **206** so that the leakage magnetic flux passing the rotating shaft **203** is minimized.

According to the present invention, the following advantages are achieved. Satisfactory performance of a non-contact rotational position sensor can be obtained while high flexibility in design is ensured, even when confronting surfaces of magnetic paths on the stator side and the rotor side are not shaped such that their lengths are even in a direction perpendicular to the rotor rotating direction. Also, since the magnetic flux can be effectively concentrated to positions where magnetic sensitive devices are attached, a non-contact rotational position sensor having high accuracy and high sensitivity can be obtained. Further, when a used permanent magnet is magnetized in the axial direction of a rotating axis, a sufficient level of detection sensitivity can be provided even with no magnetic material other than the permanent magnet being disposed on the rotor side. The inertial moment of the rotor is therefore reduced. As a result, the load of an actuator for rotating the rotor can be reduced, and hence a response of the rotor can be improved.

What is claimed is:

1. A non-contact rotational position sensor comprising:

a permanent magnet having a circular or arc-shaped outer circumference;

a shaft for supporting and fixing said permanent magnet;

upper and lower magnetic plates sandwiching said permanent magnet from above and below, at least one of said upper and lower magnetic plates being horizontally separated from each other with an air gap formed therebetween;

at least one protruded magnetic substance portion disposed between said upper and lower magnetic plates; and

a magnetic sensitive device disposed on a protruded surface of said protruded magnetic substance portion,

said permanent magnet and said shaft constituting a rotor which is rotatable relative to said upper and lower magnetic plates vertically spaced from each other,

said permanent magnetic being magnetized substantially in the direction of a rotating axis, whereby the amount of magnetic flux passing said magnetic sensitive device is varied with rotation of said permanent magnet,

wherein said upper and lower magnetic plates sandwiching said permanent magnet from above and below are formed of magnetic plates each having protruded portions at opposite ends instead of providing said protruded magnetic substance portion on at least one of said upper and lower magnetic plates, said protruded portions being bent to form pairs of upper and lower protruded portions, and said magnetic sensitive device is inserted in an air gap formed between protruded surfaces of every two upper and lower protruded portions.

2. A non-contact rotational position sensor comprising:

a rotating axis;

an annular or semi-annular magnet fixed to said rotating axis;

magnetic substance assemblies arranged in opposing relation to sandwich said magnet therebetween with a spacing greater than a thickness of said magnet left between said magnetic substance assemblies in the axial direction of said rotating axis, such that a uniform air gap is formed between said magnet and a surface of each of said magnetic substance assemblies confronting said magnet;

a pair of small air gaps formed in said magnetic substance assemblies and being smaller than said air gap; and

a magnetic sensitive device disposed in said small air gap,

wherein said magnetic substance assemblies comprise a pair of rectangularly-shaped magnetic plates, and at least one of said pair of rectangular magnetic plates has a split air gap formed along an imaginary plane passing an axial center line of said rotating axis, said air gap splitting said rectangular magnetic plate into two parts.

3. A non-contact rotational position sensor comprising:

a rotating axis;

an annular or semi-annular magnet fixed to said rotating axis;

magnetic substance assemblies arranged in opposing relation to sandwich said magnet therebetween with a spacing greater than a thickness of said magnet left between said magnetic substance assemblies in the axial direction of said rotating axis, such that a uniform air gap is formed between said magnet and a surface of each of said magnetic substance assemblies confronting said magnet;

a pair of small air gaps formed in said magnetic substance assemblies and being smaller than said air gap; and

a magnetic sensitive device disposed in said small air gap,

wherein said pair of small air gaps are formed in symmetrical positions with respect to said rotating axis situated therebetween.

4. A non-contact rotational position sensor according to claim **3**, wherein said pair of small air gaps are each formed between confronting surfaces of a pair of protrusions protruded from said magnetic plate assemblies in directions in which said protrusions come closer to each other.

5. A throttle valve assembly comprising:

an annular or semi-annular magnet attached to one end of a throttle valve;

a resin cover attached to a body in which said throttle valve is mounted;

an auxiliary caver attached to said resin cover;

magnetic path forming members attached to said resin cover and said auxiliary cover, respectively, and forming magnetic paths with said annular or semi-annular magnet situated therebetween;

a magnetic flux converging portion formed in each of said magnetic paths and concentrating a magnetic flux passing said magnetic path to a particular position; and

a magnetic sensitive device attached to said magnetic flux converging portion and detecting change of the magnetic flux in said magnetic flux converging portion caused upon rotation of said throttle valve.

6. A throttle valve assembly according to claim **5**, further comprising:

a motor for driving said throttle valve; and

a magnetic substance arranged between said motor and said magnetic paths.

7. A throttle valve assembly according to claim **6**, wherein said magnetic substance is in the form of a gear for trans-

mitting rotation of said motor to a rotating shaft of said throttle valve, or in the form of a rotating shaft of said gear.

8. A throttle valve assembly according to claim 5, wherein said resin cover has a hole for insertion of a rotating shaft provided with said throttle valve fitted thereon;

said magnetic path forming member attached to the side of said resin cover has a hole formed at the center thereof and having a diameter greater than a diameter of said rotating shaft, but smaller than a diameter of said annular or semi-annular magnet; and

said annular or semi-annular magnet is detachably attached to an end of said rotating shaft inserted through said hole in said magnetic path forming member.

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